

Claims

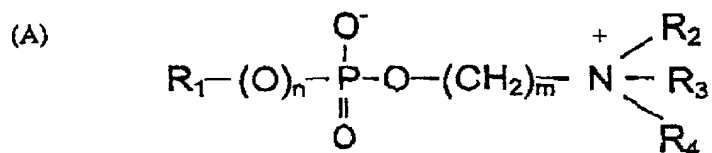
1. Combination product comprising:

(i) at least one nucleic acid containing a sequence encoding a polypeptide of interest, and

(ii) at least one phospholipid of interest,

for use which is simultaneous, consecutive or spread out over time, characterized in that said polypeptide and phospholipid of interest have cytotoxic activity.

2. The combination product of Claim 1, wherein said phospholipid of interest has a general formula:

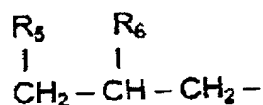


in which:

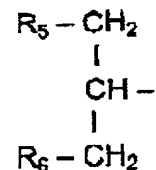
R_1 is:

(a) either a linear or branched carbon-based chain comprising from 6 to 30 carbon atoms,

(b) or a motif of formula:



or



in which R_5 represents an -A-R group, with A selected from -O-, -C(O)-, -OC(O)-, -C(O)O-, -C(S)-, -C(O)-S-, -S-, -NH- or -C(O)-NH-, and R is a linear or branched carbon-based chain comprising from 6 to 30 carbon atoms,

and R_6 either represents a hydrogen atom or has the same meaning as R_5 , with R_5 and R_6 possibly being identical or different,

and R₂, R₃ and R₄ are either hydrogen atoms or alkyl residues containing from 1 to 5 carbon atoms,

or else
$$\begin{array}{c} + \text{R}_2 \\ | \\ \text{N} - \text{R}_3 \\ | \\ \text{R}_4 \end{array}$$
 is a cyclic amine

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m is a positive integer ranging from 1 to 6 and

n is a positive integer ranging from 0 to 1.

3. The combination product of Claim 2, wherein R₁ is a linear or branched carbon-based chain comprising from 12 to 22 carbon atoms.

4. The combination product of Claim 3, wherein R₁ is a linear or branched carbon-based chain comprising 16 carbon atoms.

5. The combination product of Claim 2, wherein R₁ is an alkyl, alkenyl, alkynyl or aralkyl residue.

6. The combination product of Claim 2, wherein n = 1, m = 2 and R₂, R₃ and R₄ are methyl residues.

7. The combination product of Claim 2, wherein R₁ is an alkyl residue comprising 16 carbon atoms.

8. The combination product of Claim 1, wherein said polypeptide of interest is selected from cytokines, proteins encoded by a suicide gene, anti-angiogenic protein factors, polypeptides having chemoattractant activity and polypeptides having activity for activating cellular apoptosis.

9. The combination product of Claim 8, wherein said polypeptide of interest is a cytokine chosen from the group consisting of alpha, beta and gamma interferon, interleukins, tumour necrosis factors and colony stimulating factors.

10. The combination product of Claim 9, wherein said cytokine is interleukin-2 (IL-2) or gamma interferon (γ-IFN).

11. The combination product of Claim 1, that also comprises:

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(iii) a substance which associates with nucleic acids and/or

(iv) a substance which associates with the phospholipid of interest.

5 12. The combination product of Claim 11, wherein said substance (iii) is a cationic lipid or a cationic polymer.

10 13. The combination product of Claim 11, wherein said substance (iv) is a lipid capable of integrating into a liposome.

14. The combination product of Claim 11, also containing an adjuvant (v) selected from the group consisting of neutral, zwitterionic and negatively charged lipids.

15 15. The combination product of Claim 14, wherein said adjuvant (v) is selected from the group consisting of cholesterol, dioleoylphosphatidylethanolamine (DOPE) and derivatives thereof.

20 16. The combination product of Claim 11, wherein said nucleic acid (i), said substance (iii), said phospholipid (ii) and, optionally, said adjuvant (v) form a complex.

25 17. The combination product of Claim 16, wherein the ratio between the number of positive charges and the number of negative charges of the elements forming said complex ranges between 0.05 and 20.

18. The combination product of Claim 16, wherein said complex has a diameter of between 20 and 800 nm.

30 19. The combination product of Claim 1, 2, 11 or 16, wherein said nucleic acid (i) is a recombinant vector of plasmid or viral origin.

20. The combination product of Claim 1, 2, 11 or 16, wherein it is formulated in a vehicle which is acceptable from a pharmaceutical point of view.

35 21. Complex comprising at least one nucleic acid (i) containing a sequence encoding a polypeptide of interest, at least one phospholipid (ii) of interest, a substance (iii) which associates with nucleic acids and, optionally, an adjuvant (v), wherein said

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phospholipid of interest (ii) is as described in any of Claims 1 to 7.

22. Use of a combination product according to one of Claims 1 to 20, or of a complex according to
5 Claim 21, for preparing a medicinal product intended for treating the human or animal body.

23. Use according to Claim 22, characterized in that the treatment is an antitumour and/or antimetastatic treatment.

10 24. Use according to Claim 22 or 23, characterized in that said phospholipid of interest (ii) is administered simultaneously with the nucleic acid (i).

25. Use according to one of Claims 22 to 24, characterized in that said combination product or said
15 complex is administered intratumorally or peritumorally.

26. Use of a complex according to Claim 21, for simultaneously introducing a nucleic acid sequence (i) and a phospholipid (ii) into a cell.

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